

**REMARKS**

Applicants wish to thank Examiner Patterson for the helpful discussions during the October 30, 2003, telephone interview with the undersigned representative.

**I. The Invention**

The present invention relates to the cloning and characterization of a *Fucus* vanadium peroxidase. The present inventors identified for the first time the full length polynucleotide sequence as well as the amino acid sequence of the enzyme. Furthermore, the inventors discovered that the N-terminus of this enzyme is not necessary for its activity. As examples, two N-terminally truncated enzymes have been recombinantly produced and shown to possess enzymatic activity.

**II. Status of the Claims**

Claims 1-30 were originally filed. Subsequently, claims 1-15, 18, and 19 were canceled. Claims 16, 17, and 20-30 are currently pending. Upon entry of the present amendment, claim 17 is canceled. Claim 16 is amended to add the recitation of an isolated polypeptide that "has at least 80% amino acid sequence identity to a polypeptide as set forth in SEQ ID NO:2." This amendment is supported by claim 17 as originally filed. The recitation of "at least 90% amino acid sequence identity" in claim 16 is deleted. No new matter is introduced.

The present amendment is made to address the Examiner's concerns raised in the final Office Action mailed August 18, 2003, in accordance with the discussion between the Examiner and the undersigned during the telephone interview on October 30, 2003. The amendment places the pending claims in conditions for allowance and requires no additional search by the Examiner. Applicants respectfully request the entry of the amendment.

### **III Claim Rejections**

#### **A. 35 U.S.C. §112, Second Paragraph: Indefiniteness**

Claim 17 was rejected under 35 U.S.C. §112, second paragraph, for alleged indefiniteness. Specifically, the Examiner stated that since claim 16 recited the limitation of a polypeptide having at least 90% identity to the 441-676 segment of SEQ ID NO:2, whereas claim 17, depending from claim 16, recited the additional limitation of a polypeptide having at least 80% identity to SEQ ID NO:2, it was thus unclear if the claim 17 would further limit claim 16.

Upon entry of the present amendment, claim 17 is canceled. Applicants address the rejection as it may apply to the amended claim 16. Claim 16 currently recites, in addition to other limitations, an isolated polypeptide having at least 80% identity to a polypeptide as set forth in SEQ ID NO:2 and comprising an amino acid sequence having the sequence of the 441-676 segment of SEQ ID NO:2. Applicants submit that the amended claim 16 is free of any potential indefiniteness and respectfully request the withdrawal of this rejection.

#### **B. 35 U.S.C. §112, First Paragraph: Enablement**

Claims 16 and 20-30 were rejected under 35 U.S.C. §112, first paragraph, for alleged inadequate enablement. Applicants address this rejection as it may apply to the amended claims.

Prior to the present amendment, claim 16 was drawn to an isolated polypeptide comprising an amino acid sequence having at least 90% amino acid sequence identity to a sequence from residue 441 to residue 676 as set forth in SEQ ID NO:2, wherein the polypeptide catalyzes oxidation of o-dianisidine (ODA) when complexed with a vanadium ion, and has a molecular weight of between about 40 to about 60 kDa. The Examiner asserted that the specification does not properly enable the claim, particularly questioning whether the three recombinant vanadium peroxidases of Table 1 had shown ODA oxidation activity. On the other

hand, originally filed claim 17, which recited a polypeptide having at least 80% amino acid sequence identity to SEQ ID NO:2, was not rejected as insufficiently enabled.

As amended, claim 16 now recites an isolated polypeptide, which comprises an amino acid sequence having the sequence of residue 441 to residue 676 as set forth in SEQ ID NO:2, has at least 80% amino acid sequence identity to a polypeptide as set forth in SEQ ID NO:2, catalyzes ODA oxidation when complexed with a vanadium ion, and has a molecular weight of between about 40 kDa to about 60 kDa. Amended claim 16 therefore has a scope narrower than that of the original claim 17 as construed by the Examiner ("for the purpose of this action [] claim 17 should be limited to a polypeptide having 80% identity with SEQ ID NO:2, without regard to the identity with residues 441-676 or the molecular weight." Last paragraph on page 4 of the August 18, 2003, Office Action). Since the original claim 17 was not rejected for lack of enablement, Applicants submit that the amended claim 16 should not be rejected on the enablement ground either.

Regarding the three recombinant vanadium peroxidases of Table 1, Applicants note that all three have indeed demonstrated enzymatic activity. Table 1 (page 19) provides three recombinant polypeptides: rVPx 1, rVPx2, and rVPx3, as indicated in the first column from the left; the second column indicates the starting point of coding sequences for the three polypeptides located within the full length coding sequence of the *Fucus* vanadium peroxidase (SEQ ID NO:1); the third column indicates the length of the coding sequences for the three polypeptides; the fourth column indicates the molecular weight of the three recombinant polypeptides excluding a 6 x His fusion tag; the fifth column indicates the molecular weight of the three recombinant polypeptides including the 6 x His tag.

Based on this information, it can be determined that rVPx1 is the full length polypeptide, rVPx2 is the 137-676 segment of SEQ ID NO:2 with a molecular weight of about 40 kDa, and rVPx3 is the 313-676 segment of SEQ ID NO:2 with a molecular weight of about 60 kDa. Each of the three comprises the 441-676 segment of SEQ ID NO:2.

From page 19, line 14, to page 21, line 18, the specification provides detailed description of the experimental procedure for recombinantly generating the three polypeptides, purifying the polypeptides, and testing their enzymatic activity. The results on page 24, lines 7-11, clearly indicate that all three recombinant polypeptides, rVPx1, vRPx2, and rVPx3, possess vanadium peroxidase activity.

One additional point raised by the Examiner is the name discrepancy of *Fucus gardneri* and *Fucus distichus*. Applicants note that these two names are synonymous, which is evidenced by the attached webpage printout (Exhibit A).

In summary, Applicants respectfully request that the enablement rejection be properly withdrawn.

C. 35 U.S.C. §102 or 35 U.S.C. §103

Claim 17 was further rejected under 35 U.S.C. §102(b) as allegedly anticipated by, or, in the alternative, under 35 U.S.C. §103(a) as allegedly obvious over either the Soedjak *et al.* or Vreeland *et al.* reference. The Examiner stated that the rejection was made without the considering the limitation of a molecular weight between about 40-60 kDa (last paragraph on page 4 of the August 18, 2003, final Office Action).

Claim 17 has been canceled. Applicants address the rejection as it may apply to claim 16. As previously made of record, the two cited references describe vanadium peroxidases of approximately 64-74 kDa in molecular weight. In contrast, the amended claim 16 is without ambiguity drawn to an isolated polypeptides capable having a molecular weight of about 40-60 kDa. Neither of the Soedjak and Vreeland references provides or suggests this element. Accordingly, the pending claims are not anticipated or rendered obvious by the two references.

The rejection based on alleged anticipation or obviousness over the Soedjak *et al.* or Vreeland *et al.* reference should thus be properly withdrawn.

#### **IV. Finality of the Rejections**

The August 18, 2003, final Office Action is the first Action following a Request for Continued Examination (RCE). Applicants contend that this Action was made final improperly.

MPEP §706.07(b) states,

The claims of a new application may be finally rejected in the first Office action in those situations where (A) the new application is a continuing application of, or a substitute for, an earlier application, and (B) all claims of the new application (1) are drawn to the same invention claimed in the earlier application, and (2) would have been properly finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application.

Regarding a proper final rejection on a second action, MPEP §706.07(a) states,

Under present practice, second or any subsequent actions on the merits shall be final, except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 C.F.R. §1.97(c) with the fee set forth in 37 C.F.R. §1.17(p).

(Emphasis added)

In the present case, the Examiner has raised at least one new ground of rejection: claims 16 and 20-30 were rejected under 35 U.S.C. §112, first paragraph, for alleged lack of enablement. Specifically, the Examiner alleged that the specification does not show the claimed polypeptide having vanadium peroxidase activity. This rejection was not raised in any previous Office Action. Furthermore, this rejection is neither necessitated by Applicants' last amendment, which merely further limits the molecular weight of the claimed polypeptides, nor based on a new information disclosure statement.

As such, Applicants submit that the finality of the August 18, 2003, Office Action is improper and respectfully request that the Examiner reconsider and withdraw the finality of the rejections.

Appl. No. 09/840,762  
Amdt. dated November 17, 2003  
Amendment under 37 CFR 1.116 Expedited Procedure  
Examining Group

PATENT

**CONCLUSION**

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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Attachments (Exhibit A: *Fucus gardneri*)  
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